

WHAT IS CLAIMED:

1. An automatic work apparatus which detects spatial position of targets based on images thereof taken by means of plural observing camera devices that have lenses of non-central projection such as fisheye lenses set therein and carries out predetermined tasks comprising:

a rotation device to change viewing direction of said observing camera devices;

a target image extracting unit to extract said targets in said images taken by means of said plural observing camera devices; and

a rotation controller to control said rotation device in accordance with a certainty obtained by discriminating the target position information in response to target position that is specified by said target image extracting unit for each of said images of said targets.

2. An automatic work apparatus which specifies spatial position of targets based on images thereof taken by means of plural observing camera devices that have lenses of non-central projection such as fisheye lenses set therein and carries out predetermined tasks comprising:

a rotation device to change viewing direction of said observing camera devices;

a target image extracting unit to extract said targets in said images taken by means of said plural observing camera devices;

a position determining unit to determine said spatial positions of said targets by using image positions of said targets specified by said target image extracting unit; and

a rotation controller to control said rotation device so that said rotation device changes viewing direction of said

observing camera devices which take images, wherein at least two areas as a peripheral area and a central area are assigned to said images, of said targets in said central area in case that image positions of said targets specified by said target  
5 image extracting unit are in said peripheral area.

3. An automatic work apparatus according to Claim 2 having;

an transfer equipment to change relative distance with  
10 said targets so that said predetermined tasks are carried out by adjusting relative position against said target on a basis of spatial positions of said targets determined by said position determining unit.

15 4. An automatic work apparatus according to Claim 2 wherein;

said target image extracting unit has a function to extract said targets from said images taken by means of plural observing camera devices by specifying only picture elements  
20 that correspond to a reference color which is assigned for said targets and memorized for identifying said targets beforehand.

5. An automatic work apparatus according to Claim 4 wherein;

25 said extracted target image by said target image extracting unit is labeled with a single same ID onto plural picture elements which keep a connectivity thereover so that said plural picture elements specify said target.

30 6. An automatic work apparatus according to Claim 5 wherein;

said target image extracting unit has a function to determine an identification of said targets specified by

composures of said picture elements that correspond to a reference color which is assigned for said targets with said targets on a basis of predetermined aspect value after computing an aspect ratio of planer expansion of said picture elements.

7. An automatic work apparatus according to Claim 4 wherein;

said target image extracting unit has a function to determine an identification of said targets specified by composures of said picture elements that correspond to a reference color which is assigned for said targets with said targets on a basis of predetermined filling rate of said composures of said picture elements against a rectangular given by a vertical viewing angle and a horizontal viewing angle in a viewing angle mapping specified by said images taken by means of plural observing camera devices.

8. An automatic work apparatus according to Claim 4 wherein;

said images taken by means of plural observing camera devices are sampled with respect to colors and said reference color which is assigned for said targets is determined by eliminating a color of which area expands from the origin of Cr-Cb space chart after plotting said sampled color onto Cr-Cb space.

9. An automatic work apparatus according to Claim 2 having two observing camera devices set in right hand side and left hand side thereof, wherein;

said position determining unit comprises a distance computing module that determines distance to said target therefrom using position information of said target image specified by said target image extracting unit, a horizontal position computing  
5 module that computes horizontal position to said target using position information of said target image specified by said target image extracting unit and a vertical position computing module that computes vertical position to said target using position information of said target image specified by said  
10 target image extracting unit,

three categories of areas as a left or right peripheral area, an upper or lower peripheral area and a central area are set for each image taken by said observing camera device,

a rotation controller controls a rotational drive unit  
15 to rotate said observing camera devices when said target images locate in said left or right peripheral area,

an image processing for said target of which image locates in an upper and lower peripheral area of said image taken by said observing camera devices is carried out in such  
20 a way that horizontal position in a horizontal plane is determined by computing distance to said target by means of said distance computing module as well as horizontal position of said target is computed by said horizontal position computing module,

25 an image processing for said target of which image locates in central area of said image taken by said observing camera devices is carried out in such a way that spatial position of said target is determined by computing distance, horizontal position and vertical position to said target by  
30 means of said distance computing module, horizontal position computing module and vertical position computing module, and

a predetermined work starts to be carried out after adjusting a relative position between said target and said

automatic work apparatus on a basis of said horizontal position in a horizontal plan and said spatial position of said target.

10. An automatic work control program apparatus that,  
5 in order to control an automatic work apparatus that comprises plural observing camera devices that have lenses of non-central projection such as fisheye lenses, to change directions of said observing camera device and to carry out predetermined tasks for said target on a basis of information  
10 obtained by images taken by said plural observing cameras systems executes,

has a computer functioning for a purpose of means of target image extracting unit to extract said targets in said images taken by means of said observing camera devices and  
15 a computer functioning for a purpose of means of rotational control of the rotational drive unit to control said rotational drive unit in accordance with a certainty of positional information obtained by discriminating said target position information regarding said target in response to said  
20 target position that is specified in each image by said target image extracting unit.

11. An automatic work control program apparatus that,  
in order to control an automatic work apparatus that comprises  
25 plural observing camera devices that have lenses of non-central projection such as fisheye lenses, to change directions of said observing camera device and to carry out predetermined tasks for said target on a basis of information obtained by images taken by said plural observing cameras  
30 systems,

has a computer functioning for a purpose of means of target image extracting unit to extract said targets in said images taken by means of said observing camera devices,

a purpose of means of position evaluation to obtain the target spatial position information in response to said target position that is specified in images by said target image extracting unit and

5 a purpose of means of rotation controller to control said rotation device so that said rotation device changes viewing direction of said observing camera devices which take images, wherein at least two areas as a peripheral area and a central area are assigned to said images taken by said observing camera  
10 devices, so that said images of said targets are taken in said central area by said observing camera devices in case that image positions of said targets specified by said target image extracting unit is in said peripheral area.

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